

NON-PUBLIC?: N  
ACCESSION #: 8901180327  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: BYRON, UNIT 2 PAGE: 1 OF 3

DOCKET NUMBER: 05000455

TITLE: Reactor Trip On Indicated Low Reactor Coolant Flow Rate Caused By  
Cleaning Flow Transmitter Vent Valve  
EVENT DATE: 12/15/88 LER #: 88-012-00 REPORT DATE: 01/09/89

OPERATING MODE: 1 POWER LEVEL: 040

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: Dale St. Clair, Assistant Superintendent TELEPHONE: 815 234-5441  
Work Planning, Ext. 2888

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

#### ABSTRACT:

At 0849 on December 15, 1988 personnel entered the Unit 2 Containment Building to inspect for active boric acid leakage as a pre-refueling outage function. The unit was at 40 percent power. The inspection team observed boric acid crystals and a minor packing leak on an instrument valve labeled "2FT-434 Vent". While removing the encrusted boric acid and tightening the packing nut about one flat at 1002, an automatic reactor trip occurred due to indicated low reactor coolant loop C flow. The inspection team was unaware of the reactor trip and the Control Room Operators could not correlate any specific inspection team activities with the trip. An automatic Feedwater Isolation and automatic Auxiliary Feedwater Pump starts occurred as expected following the trip. The plant was stabilized in Hot Standby at approximately 1030.

The low reactor coolant flow signals were caused by a pressure transient in the high pressure sensing line, which is common to all three flow transmitters in the reactor coolant elbow flow meter design. By removing encrusted boric acid from the vent valve and tightening its packing, a mechanic induced sufficient

vibration in the high pressure sensing line to cause a pressure decrease at the connections to all three flow transmitters. The low flow indication persisted for approximately 200 milliseconds.

To prevent recurrence of the event, valves associated with reactor coolant loop flow transmitters will be prominently marked to prohibit physical contact unless reactor power is below the P-8 permissive setpoint (30 percent nuclear power).

A previous similar occurrence is described in Unit 1 LER 85-090.

END OF ABSTRACT

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A. PLANT CONDITION EVENT:

Event Date/Time 12-15-88/1002

Unit 2 MODE 1 - Power Operations Rx Power 40% RCS AB! Temperature/Pressure Normal Operating

B. DESCRIPTION OF EVENT:

There were no systems inoperable at the beginning of this event that contributed to its occurrence or severity. Unit 2 was in the Power Operations Mode at 40 percent reactor power. At 0849 on December 15, 1988 eight personnel entered the Unit 2 Containment Building to conduct a leak inspection of systems containing boric acid and to evaluate identified leakage for corrective action to be taken during an imminent refueling outage. The inspection team consisted of a Shift Control Room Engineer (licensed senior reactor operator), an Inservice Inspection Engineer, a Mechanical Maintenance Foreman, Mechanical Maintenance Technicians, a Health Physics Foreman and Health Physics Technicians. The inspection team observed an accumulation of boric acid crystals and a minor packing leak on a manual instrument valve (1/2 inch Anderson Greenwood, single packing nut with integral packing follower). The valve was labeled with a construction tag that read " 2FT-434 Vent". While removing encrusted boric acid from the instrument valve with a stainless steel bristle brush and tightening the packing nut about one flat at 1002, an automatic reactor trip occurred due to all three reactor coolant AB! loop C flow instruments detecting less than 90 percent of rated flow. The Nuclear Station Operator (NSO) (licensed reactor operator) was alerted to the reactor trip in the Main Control Room by the actuation of the "RCP Flow Low Above P-8 Reactor Trip" annunciator. The inspection team was unaware that a reactor trip had occurred, and although the NSO was aware of the inspection team in the Containment, he lacked the specific information to permit a correlation between inspection

team activities and the reactor trip. Plant response to the trip was normal and included an automatic Feedwater Isolation SJ! due to low average reactor coolant temperature coincident with the open reactor trip breakers and automatic starts of both Auxiliary Feedwater Pumps BA! due to lo-2 steam generator levels. Licensed operators in the Main Control Room entered and complied with the "Reactor Trip or Safety Injection Unit 2 Emergency Operating Procedure" and the "Reactor Trip Response Unit 2 Emergency Operating Procedure". The inspection team was notified of the trip and ordered to leave the Containment Building. At 1019 the NSO started the Startup Feedwater Pump and aligned flow to feed the steam generators. By 1020 all personnel had exited the Containment Building. At 1033 the NSO stopped both Auxiliary Feedwater Pumps, since the Startup Feedwater Pump was maintaining steam generator levels. The plant was stable in the Hot Standby Operational Mode at approximately 1030. The NRC Operations Center was notified of the automatic Engineered Safety Feature (ESF) actuations via the Emergency Notification System at 1342. This Licensee Event Report (LER) is submitted pursuant to 10CFR 50.73(a)(2)(iv) due to the automatic actuations of ESF systems.

#### C. CAUSE OF EVENT:

All three reactor coolant loop C elbow flow meters sensed a flow signal less than 90 percent of rated flow. Two of the three low flow signals satisfied the coincidence to trip the reactor coolant loop C loss of flow bistable. Since reactor power was above the P-8 permissive circuit setpoint of 30 percent nuclear power, the loss of flow signal in a single reactor coolant loop induced an automatic reactor trip.

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#### C. CAUSE OF EVENT: (cont.)

The low flow signals were caused by a pressure transient in the high pressure sensing line, which is common to all three flow transmitters in the reactor coolant elbow flow meter design. By removing encrusted boric acid from the 2FT-434 vent valve and tightening its packing, a Mechanical Maintenance technician induced sufficient vibration in the high pressure sensing line to cause a pressure decrease at the connections to all three flow transmitters. The pressure decrease was sensed by the transmitters as a low reactor coolant flow condition, which endured for approximately 200 milliseconds. Subsequent investigation revealed that a differential pressure decrease of approximately 2.3 psid is equivalent to a reactor coolant flow decrease from rated flow to 90 percent of rated flow. Considering that the high pressure tap senses reactor coolant crossover pipe pressure of about 2235 psig, the relatively insignificant pressure decrease

needed to trip the low flow bistable clearly demonstrates the sensitivity of the reactor coolant flow instrumentation. The vent valve serves extremely sensitive instrumentation and was not clearly marked to indicate its specific function nor its potential impact on power operation.

#### D. SAFETY ANALYSIS:

Actual reactor coolant flow was maintained at its design rating throughout this event. The automatic reactor trip was caused by an incorrect indication of low flow, that did not reflect actual flow conditions. The plant responded normally following the trip and all ESF systems actuated properly. Had this event occurred at full power, the ESF system response would have been identical. The event did not impact plant or public safety.

#### E. CORRECTIVE ACTIONS:

To prevent recurrence of this event, valves associated with reactor coolant loop flow transmitters will be prominently marked to prohibit physical contact unless reactor power is below the P-8 setpoint. Corrective actions are tracked by Action Item Records 454-225-89-0001 and 455-225-89-0002. Tightening the packing nut on the 2FT-434 vent valve one flat was successful in stopping the minor packing leak.

#### F. PREVIOUS OCCURRENCES:

##### LER NUMBER TITLE

454-85-090 "Unit Reactor Trip On Low Loop Flow While Venting Flow Transmitter"

The applicable instrument maintenance procedure was revised to prohibit reactor coolant flow transmitter maintenance unless reactor power is below the P-8 setpoint. This preventive action was not intended to prohibit the agitation of valves connected to the flow transmitters, as occurred during the December 15, 1988 event. The currently proposed preventive action expands the previous actions and should minimize reoccurrence of low reactor coolant flow trips caused by instrument sensitivity.

#### G. COMPONENT FAILURE DATA:

##### MANUFACTURER NOMENCLATURE MODEL NUMBER MFG PART NUMBER

Not Applicable

Commonwealth Edison  
Byron Nuclear Station  
4450 North German Church Road  
Byron, Illinois 61010

January 9, 1989

Ltr: BYRON 89-0017

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Dear Sir:

The enclosed Licensee Event Report from Byron Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(iv).

This report is number 88-012; Docket No. 50-455.

Sincerely,

R. Pleniewicz  
Station Manager  
Byron Nuclear Power Station

RP/dm

Enclosure: Licensee Event Report No. 88-012-00

cc: A. Bert Davis, NRC Region III Administrator  
P. Brochman, NRC Senior Resident Inspector  
INPO Record Center  
CECo Distribution List

\*\*\* END OF DOCUMENT \*\*\*

ACCESSION #: 8901180334

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